2008

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For many years, field researchers studying both African (Loxodonta africana) and Asian (Elephas maximus) elephants have indicated that they have observed relatively few births in situ, suggesting that most elephant dams give birth at night. For example, according to Cynthia Moss, "Possibly the majority of births occur at night and perhaps those that do take place in the daytime happen in secluded places" (1988, p. 151). Others, for example Clive Spinage, have referred to "the old beliefs that the cows retreated to 'calving grounds' or that birth took place at night." (Spinage, 1994, p. 90). Although observers in several areas of Africa and Asia are keeping systematic birth records (Sukumar, 2003, p. 256), nobody seems to have summarized the distributions of birth times at these sites.

Method

I searched books, professional journals and the Internet for data on elephants born under the care of humans. On the internet, most of the observations were obtained from Zoo press releases (for example, press releases from Dickerson Park or the Ringling Bros. and Barnum and Bailey Center for Elephant Conservation), the websites of professional organizations (for example, the International Elephant Foundation and the Elephants Managers Association), from documents or reports posted by professional organizations (such as the European Elephant Keepers and Managers Association) and from newspaper articles. Before relying on newspaper articles, I used a second source to confirm the information in each article.

Results

The sources provided birth times for 40 African elephants: 21 females and 19 males, and 64 Asian elephants: 34 females and 30 males. The Appendix lists the 45 zoos providing data for at least one calf. Thirty institutions provided data for one or two calves, and 13 institutions provided data for 3-5 calves. Eleven calves resided at the Ringling Bros. and Barnum & Bailey Center for Elephant Conservation and 9 resided at the San Diego Wild Animal Park. Most of the calves (68%) were born during the last 10 years, though the earliest data came from a calf born in 1962.

The birth times for 104 calves are summarized in Figure 1, a histogram that depicts four six-hour blocks of time: 00:01-6:00 hours, 6:01-12:00 hours, 12:01-18:00 hours and 18:01-24:00 hours. Chi-square statistical tests (Preacher, 2001) indicated that both African calves and Asian calves were more likely to be born during the night (6pm-6am), than during the day (6am-6pm). [African: $\chi 2\ (3) = 13.4$, $p = 0.004$; Asian: $\chi 2\ (3) = 10.13$, $p = 0.018$.] Overall, 69% of the calves were born overnight.

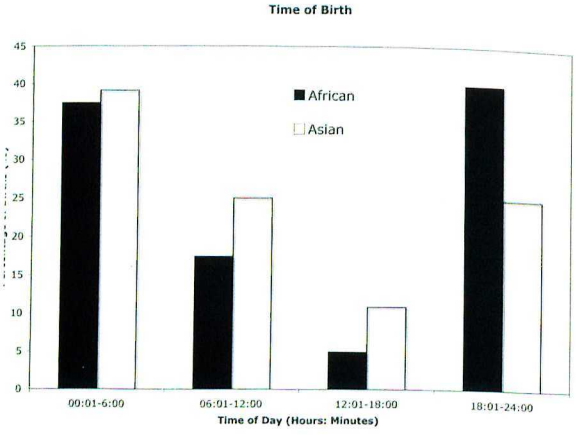

Figure 1. The percentages of African elephant calves (filled columns) and Asian elephant calves (empty columns) born during successive 6-hour periods in a day.

Discussion

For both African and Asian elephants, calves were more likely to be born overnight, 18:00 hours to 06:00 hours, than during the day. These data obtained from elephants under human care are consistent with the suggestion (Moss, 1988) that most African elephant calves in situ are born at night. After a dam has remained in labor for several hours without the calf advancing through the birth canal, some caretakers inject oxytocin intravenously in order to stimulate parturition (for example, Maluy, 2000). It is not yet clear whether the patterns of birth-times are different for those dams receiving oxytocin and those not receiving it. Neither is it clear whether there is a sex-difference in birth patterns. These issues deserve further investigation.

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APPENDIX

The number, species and sex of the calves born at each location. La/Em = African/Asian elephants; M/F = Male/Female. The number of calves is given in parentheses.

African Lion Safari, ON, Canada: EmF (3); EmM (1)
Allwetter Zoo, Germany: EmM (1)
Amersfoort Zoo, Netherlands: EmF (1)
Basel Zoo, Switzerland: LaF (1)
Berlin Tierpark, Germany: EmM (1)
Blijdorp Zoo, Rotterdam, Netherlands: EmF (1); EmM (2)
Boras Zoo, Sweden: LaF (1)
Busch Gardens, USA: EmF (1)
Calgary Zoo, Canada: EmF (2)
Chhat Bir Zoo, India: EmF (1)
Chester Zoo, UK: EmF (3)
Cincinnati Zoo: EmM (1)
Colchester Zoo, UK: LaM (2)
Columbus Zoo, Ohio, USA: EmM (1)
Copenhagen Zoo, Sweden: EmM (2)
Dickerson Park Zoo, MO, USA: EmF (2); EmM (2)
Disney Animal Kingdom, USA: LaF (2); LaM (1)
Dresden Zoo, Germany: LaM (1)
Dublin Zoo, Ireland: EmF (1)
Emmen Noorderdierenpark, Netherlands: EmF (1); EmM (1)
Have Trunk – Will Travel, USA: EmF (1); EmM (2)
Houston Zoo, USA: EmF (2); EmM (1)
Indianapolis Zoo, USA: LaF (2); LaM (2)
Knoxville Zoo, Tennessee: LaF (1)
Korat Zoo, Thailand: LaM (1)
Louisville Zoo, KY, USA: LaM (1)
Miami Metro Zoo, USA: EmM (1)
Montgomery Zoo, Alabama: LaF (1)
National Zoological Park, USA: EmF (1); EmM (1)
Nong Nooch Gardens, Thailand: EmM (1)
Oakland Zoo, USA: LaM (3)
Oregon Zoo, USA: EmF (1); EmM (2)
Parque de la Naturaleza, Cabarceno, Spain: LaF (1); LaM (2
Pittsburgh Zoo, USA: LaF (1); LaM (1)
Riddle's Elephant & Wildlife Sanctuary, AK, USA: LaF (2)
Ringling Bros./Barnum and Bailey Center for Elephant Conservation: EmF (6); EmM (5)
Rosamond Gifford Zoo, USA: EmF (3); EmM (1)
San Diego Wild Animal Park, USA: EmM (1); LaF (5); LaM (3)
Schönbrunn Tierpark, Vienna, Austria: LaF (1); LaM (1)
St. Louis Zoo, USA: EmF (1)
Toledo Zoo, OH, USA: LaM (1)
Toronto Zoo, Canada: LaF (1)
Woodland Park Zoo, USA: EmF (1)
Wuppertal Zoo, Germany: LaF (2)
Zurich Zoo, Switzerland: EmF (2); EmM (3)

AUTHOR NOTES

Butler University funded the preparation of this article. Ms. Barbara Howes provided access to many of the, often obscure, sources of the data provided here. A complete list of all sources is available from the author at the above address, or through email: loxodontabob@yahoo.com ❖